Influenza Backgrounder

Influenza Overview

Influenza causes an average of 36,000 deaths and 200,000 hospitalizations in the U.S. every year.[1,2] Combined with pneumonia, influenza is the seventh leading cause of death in the nation.[3] Influenza can lead to serious complications by aggravating existing medical conditions; it can also lead to infections of the brain, heart and other organs.[1]

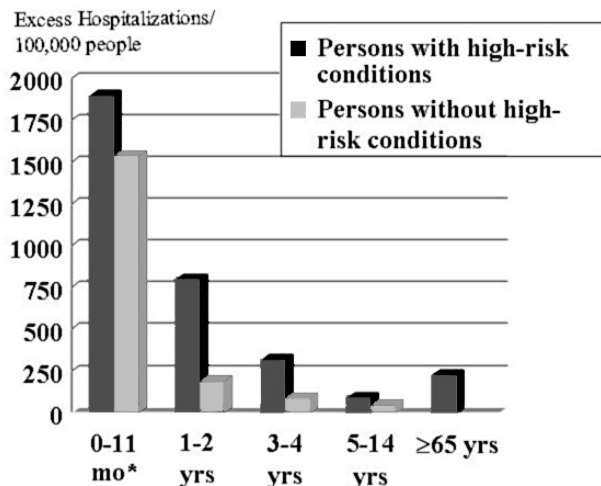
Influenza is a highly contagious virus that is spread easily from person to person, primarily when an infected individual coughs or sneezes. The virus can be transmitted even before influenza symptoms appear. The influenza virus causes “the flu,” one of the most severe illnesses of the winter season.[1]

Classically, the flu is characterized by the abrupt onset of high fever, chills, a dry cough, headache, runny nose, sore throat and muscle and joint pain. It can cause extreme fatigue that may last days or weeks. However, only about 50 percent of individuals will exhibit these classical symptoms.[1]

Influenza Among Infants and Children

Rates of influenza infection are highest among children. Moreover, those younger than 24 months are hospitalized with influenza-related complications at rates similar to those in elderly persons.[4,5] Additional findings show that when influenza viruses are circulating in the community, for every 100 children younger than 15 years of age, six to 15 outpatient visits are attributable to influenza.[5] High-risk children, in particular, face increased risks from influenza infection. These children are five times more likely than healthy children of the same age to be hospitalized with influenza-related illnesses.[1]

In addition to causing hospitalizations, influenza can be fatal in children. During the 2003-2004 influenza season, the Centers for Disease Control and Prevention (CDC) reported more than 150 influenza-related deaths among children aged less than 18 years. Many of these children did not have underlying medical conditions before being struck down with influenza.[6]



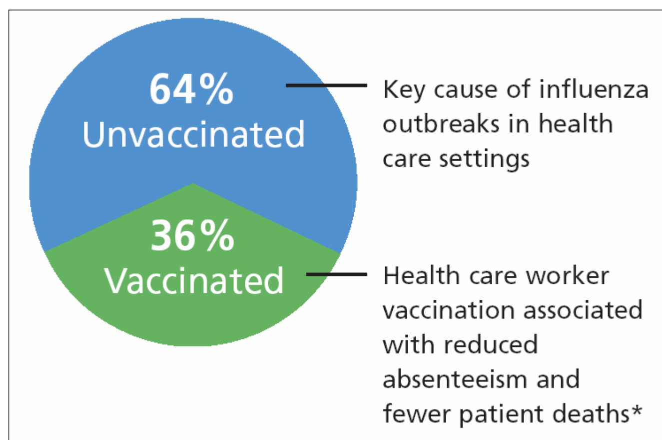
Despite the serious health threat, influenza immunization rates remain low for high-risk children. For example, more than eight million infants and children with asthma should receive influenza vaccine each year. However, nearly 70 percent do not receive an annual immunization – this is the lowest vaccination rate for any recommended childhood vaccine in the U.S.

Missed opportunities for influenza immunization are common among children with chronic medical conditions.[7] Children can be immunized at the same time they are given other routine vaccinations during the influenza season.[1]

Influenza Infection in Health Care Workers

The CDC has long recommended annual influenza vaccination for all health care workers, yet only 36 percent of this population is immunized annually. Health care workers infected with influenza can transmit the highly contagious virus to patients in their care, who may be at high risk for influenza-related complications, leading to serious morbidity and mortality.

Research suggests unvaccinated health care workers can be a key cause of outbreaks in a variety of health care settings. Institutional influenza outbreaks can have serious implications – patients are at risk of contracting influenza; staff shortages can result or be exacerbated; admissions may be curtailed; and increased costs may be incurred. Published studies clearly demonstrate these outcomes.[8,9,10,11]



Source: CDC. MMWR. 2003;52(RR-8):1-34.

Vaccination Recommendations

The CDC's Advisory Committee on Immunization Practices (ACIP) recommends the following groups receive an annual influenza vaccination:

- *Persons at increased risk for complications*
  - Everyone aged 50 years and older
  - All infants and children aged 6-23 months*
  - Residents of nursing homes and other chronic-care facilities
  - Adults and children who have chronic disorders of the pulmonary or cardiovascular systems, including asthma*
  - Those with diabetes, chronic anemia and heart, kidney or liver disease*
  - Individuals being treated for immune suppression, such as HIV or AIDS*
  - Children and adolescents with are receiving long-term aspirin therapy*
- *Women who will be pregnant during influenza season*
- *Persons who can transmit influenza to those at high risk*
  - Health care workers and all persons within medical settings
  - All household contacts and out-of-home caregivers of children younger than 24 months, including grandparents, siblings, parents and babysitters*
  - Household contacts (including children) of persons in the above mentioned high-risk groups*

**Note: Children under 9 years of age receiving influenza vaccine for the first time need a second booster dose of vaccine one month after the initial dose.*

Populations Recommended to Receive Annual Influenza Immunization	
Group	**Estimated Number**
All aged 50 years and older	75,471,070
All children aged 6 months to 18 years old with high-risk conditions *(includes 5,640,000 healthy children 6 through 23 months of age)*	13,690,000
Adolescents and adults 18 to 49 years old with high-risk conditions	16,983,876
Women pregnant during influenza season	2,119,391
Health care workers	13,850,828
Household contacts of high-risk children from birth to 18 years old *(includes healthy children 0-23 months old)*	27,240,000
Household contacts of high-risk persons 18 years of age and older	24,298,165
ESTIMATED TOTAL	**173,653,330**

Source: Centers for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP) MMWR 2004;53(No. RR-6):8 and Singleton, ACIP 2002.

Importance of Annual Immunization

Immunization provides the best protection against influenza. The optimal time to get vaccinated is in October and November as influenza season usually begins in December and it takes approximately two weeks after immunization to develop protective antibodies. The season usually peaks in January or February, and continues through March, so vaccination in December and January or beyond is still recommended. The degree of vaccine effectiveness depends on several factors, including the age and health of the vaccine recipient and the match between circulating virus strains and those included in the vaccine.

Each year, the CDC and other agencies assess vaccine supply and adjust the immunization schedule as necessary. Currently, the CDC anticipates enough vaccine supply for the 2004-2005 influenza season and encourages the public to seek influenza immunization to protect themselves against this serious virus.

Vaccine Types

There are two types of influenza vaccine available, the injectable trivalent inactivated vaccine (TIV) and nasal live-attenuated influenza vaccine (LAIV).

The inactivated influenza vaccine (TIV) has been used safely and effectively for decades. The influenza virus used in the vaccine is “killed” and cannot cause influenza. The vaccine is approved for use in anyone 6 months of age and older, regardless of health status.

The nasal vaccine (LAIV) is a new alternative to the injectable vaccine that is approved for use in healthy persons aged 5 to 49 years. LAIV can be administered to those in close contact with persons at high risk for influenza-related complications, except those with severe immunosuppression (e.g., patients with hematopoietic stem cell transplants).

Who Should Not Receive Influenza Vaccine

Individuals with egg allergies or those who have had a previous vaccine-associated allergic reaction should avoid immunization. Persons with acute febrile illnesses (high fever) should usually wait until their symptoms subside. However, vaccination can proceed during minor illnesses, with or without fever, particularly among children with mild upper respiratory tract infections or hay fever.

Certain groups should not receive LAIV, including persons younger than 5 years of age, those 50 years and older, children or adolescents taking aspirin, pregnant women and individuals with certain underlying medical conditions such as asthma and diabetes.

Adverse Effects of Influenza Vaccination

The most frequent adverse effect of the injectable influenza vaccine is soreness at the injection site for one to two days. Occasionally, some people experience a period of mild fever and fatigue for a day or two following immunization. The injectable vaccine is made from an inactivated, or dead, virus and cannot transmit infection.

Studies show that side effects from the nasal influenza vaccine are generally mild and temporary. The most common is runny nose; others included various cold-like symptoms, such as headache, cough, sore throat, tiredness/weakness, irritability and muscle aches.

As with all vaccines, rarely an allergic reaction may occur in either the injectable or nasal influenza vaccine.

Vaccine Strain Selection

Each year a new influenza vaccine is formulated to protect against predominant circulating influenza strains. The 2004-2005 influenza vaccine protects against A/Fujian/411/2002 (H3N2)-like, A/New Caledonia/20/99 (H1N1)-like and B/Shanghai/361/2002-like strains. Because circulating strains mutate (change) constantly, it is not unusual that in some years the circulating influenza virus strains may not match exactly those contained in the vaccine. However, research has shown the vaccine is still protective against infection and reduces severity of influenza-associated complications.

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[1] Centers for Disease Control and Prevention. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2004; 53(RR-6):1-40.

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[5] Neuzil KM, Mellen BG, Wright PF, Mitchel EF Jr, Griffin MR. The Effect of Influenza on Hospitalizations, Outpatient Visits, and Courses of Antibiotics in Children. *N Engl J Med* 2000;342:225-31.

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